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Proposed External Research Project
on
"The Relation of Weather to Yearly Variations of
Crop Yields in the USSR and Communist China"

1. Objective: To develop a precise correlation between weather and its effect on yields and production of specific crops in the USSR and Communist China. This objective is to be accomplished through a systematic analysis of historical weather and crop yield data for selected areas in the USSR and Communist China particularly where variations in weather have been accompanied by significant variations in yields.

Three specific research objectives fall within the scope of the proposed project:

(1) To develop a non-subjective methodology for the utilization of current weather data in the estimation of crop yields in the USSR and Communist China. This non-subjective method would be expected to replace the method in current use in which analysts subjectively evaluate the effect of weather on crop yields.

(2) To determine the extent of cyclical patterns in the historical weather data for the USSR and China and their relation to variations in yields. Knowledge of the presence of definite historical weather patterns and their relation to variations in yields will make it possible to estimate the probable range and frequency of variations in yields during the decades ahead.

(3) To evaluate the effect of weather on yields and consequently production in the USSR and China during recent years. Attainment of this objective will aid in evaluating the achievements in Soviet and Chinese agriculture which may be attributed to governmental programs and policies.

2. Situation: The Food and Agriculture Branch has primary responsibility for providing estimates of capabilities, vulnerabilities and intentions of the Sino-Soviet Bloc as relates to agriculture. Agriculture is one of the most important sectors of the Bloc economy, not only as the sector of origin of a large share of national income, and

as a sector accounting for an even greater share of the civilian labor force, but also in terms of its effect as a depressant or stimulant on national economic growth. The exposition of agriculture as a problem of paramount importance in bloc policy is common knowledge.

Grain is the single most important crop in both China and the Soviet Union and is proclaimed to be the key to the further development of agriculture. The unique importance of grain necessitates a detailed knowledge of yields per hectare and gross production. Year to year variations in yields are a function of variations in inputs, technology, insects and diseases, and especially weather conditions. Although the Food and Agriculture Branch utilizes weather information in estimating yields, limitations of manpower preclude more than a crude, subjective treatment of this most important variable.

Information on weather conditions in the Sino-Soviet Bloc (including temperature, precipitation, and state of the ground) is supplied to the Food and Agriculture Branch on a current basis by the Air Weather Service. Air Weather Service has recently suggested a refinement in their reporting which would result in the receipt of data more directly related to crop production, i.e., soil moisture availability and precipitation-evapotranspiration values. Data received from Air Weather Service is not classified, and no doubt could be furnished to the project contractor.

The significance of the effect of weather on crop yields was emphasized by the Agricultural Advisory Panel in the report of its April 1959 meeting:

Concerning the Soviet Union: "In my opinion, for what it is worth, the most important unknown concerning the significant increase in the agricultural output of the Soviet Union since 1956 is the possible effect of weather during the four years 1955-58 compared to the previous period 1950-54. . . ."

Projections of agricultural output over the next five years or so would be on a much firmer basis if we had more definite information concerning the effects of weather on output. The relative success that the French has had in estimating yields on the basis of weather information, but utilizing quite crude and subjective techniques, indicates that more time and effort might yield substantial knowledge of the contribution of favorable weather, if any, during the recent period of increasing output."

Concerning Communist China: "The work that is now being considered in mapping agricultural areas in terms of precipitation-evapotranspiration values merits careful study in relation to Chinese agriculture."

3. Operational Outline:

a. A considerable amount of research completed in the U.S. and other countries, has been on the effect of weather on crop yields and production. The results of this work should be utilized wherever possible as a guide in the analytical work on the historical weather and crop yield data.

b. The work on this phase of the project is to be confined to the semi-arid and sub-humid regions. It is believed that the influence of weather variations is most important for these crops, and in these areas. Weather data (including at least precipitation and temperature) and yield data (including yields for total grain, wheat, rye, barley, oats, corn, rice, millet, and soybeans are to be compiled for a historical period of 25-30 or more years.

c. The historical weather data and crop yield data for the semi-arid and sub-humid climatic regions, are to be correlated using single or multiple independent variables. Experimentation will be attempted utilizing weather variables such as soil moisture availability, the Thornthwaite evapotranspiration ratio, and variations of this ratio.

d. The existence of cyclical or other weather patterns and their influence on crop yields is to be determined.

e. A methodology or formula for using quantitative weather data in the estimation of crop yields is to be prepared.

f. The effect of weather on yields during the recent past (1953-55) is to be analyzed.

4. Coordination: The proposed project is complementary to a related project, now being initiated, which deals primarily with crop acreage patterns in Chinese agriculture. This project will be coordinated with the Air Weather Service and ORR classified internal research. The results of these efforts will fill a prominent gap in agricultural intelligence on the Sino-Soviet Bloc.

5. Reports: Substantive results of the project will be presented in reports covering items a through f under paragraph 3 above. The reports will contain a full statement of methodology and sources as well as appropriate interpretation of statistical data. By-products of probable interest to the sponsor will be noted, and the project working papers and files will be made accessible to the sponsor. The project director will make monthly progress reports to the project monitor.

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6. Future Requirements: It is anticipated that the terms of the project may be extended to include other important crops and geographic areas, if results warrant such an extension.

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7. Proposed Contractor: A proposed contractor has not been selected. 25X1A5a1 Among those potential contractors under consideration are [REDACTED]

[REDACTED] the Department of Agriculture, and several agricultural colleges. Other research institutions engaged in climatological work will be considered. On the basis of the project objectives and operational outline as presented above, it is planned to hold exploratory discussions on the proposed research project with several of the potential contractors. Interested groups will be requested to submit their detailed proposals, including estimated costs, for undertaking this basic research work. Although estimates of total costs are not yet available, it is believed that this project can be completed for [REDACTED]

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